WHAT IS CLAIMED IS:

1. A digital IF demodulator, including:

an analog-to-digital (A/D) converter configured to receive an analog IF signal and generate a digital IF signal having an audio component and a video component; and

a video recovery circuit, including

a quadrature multiplier, coupled to an output of said A/D converter and responsive to a first local oscillator signal, said parallel multiplier configured to down-convert said digital IF signal using said first local oscillator signal to generate a down-converted digital IF signal;

a video filter coupled to an output of said parallel multiplier;

a video complex mixer coupled to an output of said video filter and a second local oscillator signal, said video complex mixer configured to further down-convert said video component of said digital IF signal to a video baseband signal;

a Nyquist filter that receives said video baseband signal from said video complex mixer and performs Nyquist shaping on said video baseband signal;

an outer feedback loop that detects an output of said video filter and generates said first local oscillator signal so as to center said down-converted digital IF signal in a passband of said video filter; and

an inner feedback loop that also detects an output of said video filter and generates said second local oscillator signal so as to center said video baseband signal in a passband of said Nyquist filter.

2. The digital IF demodulator of claim 1, further comprising:

an audio recovery circuit, including

an audio complex mixer coupled to an output of said parallel multiplier, said audio complex mixer configured to down-convert said audio component to an audio baseband signal, and said audio complex mixer being driven by an audio loop oscillator; and

an FM demodulator that demodulates said audio baseband signal to generate a digital audio output.

3. The digital IF demodulator of claim 1, wherein said outer feedback loop includes:

a loop low pass filter coupled to an output of said parallel multiplier for removing high frequency video content from said down-converted signal;

a loop complex mixer coupled to said loop low pass filter, said loop complex mixer being responsive to said second local oscillator signal;

a rectangular to polar converter (RPC) for generating a phase output and an amplitude output based on an output of said complex mixer;

a zero order hold circuit coupled to said phase output of said RPC and an outer loop filter coupled to an output of said zero order hold circuit; and

an outer loop oscillator coupled to said outer loop filter for supplying said first oscillator signal to said parallel multiplier in the form of an outer loop in-phase signal and an outer loop quadrature signal;

wherein said outer loop feedback centers said down-converted digital IF signal on said video filter.

4. The digital IF demodulator of claim 3, wherein said outer feedback loop is tunable to accommodate different communications standards.

5. The digital IF demodulator of claim 3, wherein said inner feedback loop comprises:

said loop low pass filter;

said loop complex mixer coupled to an output of said loop low pass filter;

said rectangular to polar converter (RPC) coupled to an output of said loop low pass filter;

an inner loop filter coupled to said phase output of said RPC; and

an inner loop oscillator coupled to said inner loop filter for supplying said second local oscillator signal to said video complex mixer and said loop complex mixer in the form of an inner loop in-phase signal and an inner loop quadrature signal;

wherein said inner loop corrects fast phase perturbations in the IF demodulator.

6. The digital IF demodulator of claim 5, wherein said inner loop filter has a higher bandwidth than said outer loop filter.

7. The digital IF demodulator of claim 5, wherein said inner loop filter has a defective pole so that accumulated gross frequency offsets leak to said outer feedback loop.

8. The digital IF demodulator of claim 1, wherein said Nyquist filter is configured using a digital signal processor.

9. The digital IF demodulator of claim 1, further comprising:

a group delay filter coupled to an output of said Nyquist filter;

an audio trap filter coupled to an output of said group delay filter, said digital video output based on an output of said audio trap filter.

10. The digital IF demodulator of claim 1, wherein said Nyquist filter performs Nyquist shaping of said video baseband signal.

11. The digital IF demodulator of claim 3, wherein said quadrature multiplier comprises:

a first multiplier configured to multiply said outer loop in-phase signal with said digital IF signal; and

a second multiplier configured to multiply said outer loop quadrature with said digital IF signal.

12. The digital IF demodulator of claim 5, wherein said outer and inner loop oscillators are comprised of a sine/cosine look-up table coupled to an output of a numerically controlled oscillator.

13. The apparatus of claim 3, further comprising:

a programmable gain amplifier coupled to an input of said A/D converter and providing said analog IF signal; and

an automatic gain control circuit responsive to said amplitude output of said RPC so as to control a gain of said programmable gain amplifier.

14. The digital IF demodulator of claim 13, wherein a gain of said programmable gain amplifier is determined to use a full dynamic range of said A/D converter.

15. The digital IF demodulator of claim 2, wherein said digital IF demodulator is at least partially disposed on a silicon substrate, according to a Complementary Metal Oxide Semiconductor (CMOS) process.

16. The digital IF demodulator of claim 2, wherein said audio component of said digital IF signal includes an audio carrier that is offset in frequency from a picture carrier in said video component of said digital IF signal.

17. The digital IF demodulator of claim 16, wherein said audio carrier is offset from said picture carrier by approximately 4.5 MHz.

18. The digital IF demodulator of claim 16, wherein said audio carrier is offset from said picture carrier by approximately 5.5 MHz.

19. The digital IF demodulator of claim 16, wherein said audio carrier is offset from said picture carrier by approximately 6.0 MHz.

20. The digital IF demodulator of claim 16, wherein said audio carrier is offset from said picture carrier by approximately 5.0 MHz.

21. A method of demodulating an analog IF signal having a video component and an audio component, comprising:

digitizing the analog IF signal to create a digital IF signal having a video component and an audio component;

generating an outer loop oscillator signal having an in-phase component and a quadrature component, wherein said outer loop oscillator signal corrects gross frequency errors in said digital IF signal;

down-converting the digital IF signal using a quadrature parallel multiplier driven by said outer loop oscillator signal;

filtering and decimating said down-converted digital IF signal;

generating an inner loop oscillator signal having an in-phase component and a quadrature component, wherein said inner loop oscillator corrects fast phase perturbations in said digital IF signal;

down-converting said filtered and decimated digital IF signal to a video baseband signal using a video complex mixer driven by said inner loop oscillator signal; and

recovering a digital video output from said video baseband signal.

22. The method of claim 21, wherein said recovering step includes:

performing Nyquist shaping on said baseband signal;

compensating for group delay in said baseband signal; and

removing said audio component from said baseband signal so that only said video component remains.

23. The method of claim 21, wherein said audio component in said digital IF signal is offset in frequency from said video component, further comprising:

generating an audio oscillator signal based on said frequency offset between said video component and said audio component; and

down-converting said audio component of said down-converted digital IF signal using a audio complex mixer driven by said audio oscillator signal to generate an audio baseband signal.

24. The method of claim 23, further comprising:

filtering and decimating said audio baseband signal; and

FM demodulating the result of said filtering and decimating step, to produce a digital audio output.

25. The method of claim 21, wherein at least one of said inner loop oscillator signal, said outer loop oscillator signal and said audio oscillator signal are generated by a numerically controlled oscillator and a sine/cosine look-up table.

26. A digital IF demodulator, including:

an analog-to-digital (A/D) converter that receives an analog IF signal and converts it to a digital IF signal;

a quadrature multiplier that down-converts said digital IF signal to a baseband signal having a video component and an audio component, said down-conversion using a quadrature multiplier driven by an outer feedback loop that corrects gross frequency errors in said digital IF signal;

a video recovery circuit that selects said video component from said baseband signal and further down-converts said video component to a video baseband using a video complex mixer driven by an inner feedback loop that corrects fast phase perturbations in said digital IF signal and;

an audio recovery circuit that (i) receives said baseband signal from said parallel multiplier, and (ii) down-converts said audio component to an audio baseband signal using an audio complex mixer.

27. The digital IF demodulator of claim 26, wherein said outer feedback loop comprises:

a loop low pass filter coupled to an output of said quadrature multiplier for removing high frequency video content from said down-converted signal;

a loop complex mixer coupled to an output of said low pass filter, said loop complex mixer being responsive to feedback from said inner loop;

a rectangular to polar converter (RPC), coupled to an output of said loop complex mixer, said RPC generating a phase output and an amplitude output;

a zero order hold circuit coupled to said phase output of said RPC for slowing said phase output;

a outer loop filter coupled to an output of said zero order hold circuit; and

an outer loop oscillator coupled to an output of said outer loop filter for supplying feedback to said quadrature multiplier in the form of an outer loop in-phase signal and a outer loop quadrature signal;

wherein said outer loop feedback drives said parallel multiplier and centers said down-converted digital IF signal in a passband of said video filter.

28. The digital IF demodulator of claim 27, wherein said inner feedback loop comprises:

said loop low pass filter;

said loop complex mixer coupled to said loop low pass filter;

said rectangular to polar converter (RPC) coupled to said loop low pass filter;

an inner loop filter coupled to said phase output of said RPC; and

an inner loop oscillator controlled by an output of said inner loop filter for supplying feedback to said video complex mixer and said loop complex mixer in the form of an inner loop in-phase signal and an inner loop quadrature signal.

29. The digital IF demodulator of claim 28, wherein said inner loop filter has a higher bandwidth than said outer loop filter.

30. The digital IF demodulator of claim 28, wherein said inner loop filter has a defective pole so that accumulated gross frequency offsets leak to said outer feedback loop.

31. The digital IF demodulator of claim 26, wherein said video recovery circuit further includes at least one filter that selects said video component from said baseband signal.

32. The digital IF demodulator of claim 26, wherein said audio recovery circuit includes at least one filter that selects said audio component from an output of said parallel multiplier.

33. The digital IF demodulator of claim 1, further comprising a filter coupled to an input of said A/D converter, said filter being capable of processing both an analog television signal and a digital television signal.

34. The digital IF demodulator of claim 33, wherein said filter is a surface acoustic wave filter.

35. The digital IF demodulator of claim 33, wherein said analog television signal is an National Television Standards Committee (NTSC) signal.

36. The digital IF demodulator of claim 33, wherein said analog television signal is a Phase Alternation Line (PAL) signal.

37. The digital IF demodulator of claim 33, wherein said analog television signal is a Systeme Electronique Couleur Avec Memoire (SECAM) signal.

38. The digital IF demodulator of claim 1, further comprising:

an automatic gain control (AGC) loop, coupled to the A/D converter output, so as to ensure said analog input signal utilizes a dynamic range of said A/D converter.

39. The digital IF demodulator of claim 1, wherein said digital IF demodulator is capable of performing both NTSC demodulation and digital signal demodulation on a common substrate.

40. The digital IF demodulator of claim 2, wherein said A/D converter, said video recovery circuit, and said audio recovery circuit are configured on a common substrate, so that said digital IF demodulator is capable of performing both NTSC demodulation and digital signal demodulation on said common substrate.

41. The digital IF demodulator of claim 2, wherein an analog front-end is coupled to said input of said A/D converter, said analog front-end configured to process both NSTC and digital TV signals.

42. The digital IF demodulator of claim 41, wherein said analog front-end includes at least one SAW filter and one amplifier that are capable of processing both said NTSC and digital TV signals.

43. The digital IF demodulator of claim 3, wherein the inner loop is disabled.

44. The digital IF demodulator of claim 3, wherein the input to the inner and outer loop filters is taken directly from the loop low pass filters.

45. The digital IF demodulator of claim 28, wherein the inner loop is bypassed.

46. The digital IF demodulator of claim 28, wherein the input to both the inner and outer loop filters is taken directly from the loop low pass filters.

47. The digital IF demodulator of claim 33, wherein said filter is composed of discrete circuit elements.